# CONTRIBUTIONS TO THE FLORA OF BOREAL SASKATCHEWAN[1]

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The flora of boreal Saskatchewan is very poorly known although collections were made there as early as 1819 by Sir John Richardson and in 1827 by Thomas Drummond while these botanists were associated with Sir John Franklin's first and second expeditions respectively. In 1926 the northwestern corner of the province was explored by Hugh Raup and his extensive botanical collections made in the Lake Athabasca area constitute a very important contribution to the botanical knowledge of this region (Raup, 1936). Between 1933 and 1941 the Saskatchewan botanists, W. P. Fraser and R. C. Russell, collected in the southern boreal forest mainly in and around the Prince Albert National Park and in 1950 J. Hudson collected in the Amisk Lake area near Flin Flon, Manitoba. In 1961 there was a renewed interest in the botany of northern Saskatchewan and reports of botanical expeditions have been published

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Map A. The northern 80% of Saskatchewan. Scale: 1 inch equals 80 miles. Dashed line the approximate southern boundary of the boreal forest.

Map B. Detail map of northwestern Saskatchewan. Scale: 1 inch equals 24 miles. 1. William River sand dunes, Lat. 59° 02′, Long. 109° 05′; 2. Little Gull Lake, Lat. 59° 01′, Long. 109°; 3. McFarlane River sand dunes, Lat. 59° 12′, Long. 108° 01′; 4. Yakow Lake, Lat. 59° 12′, Long. 108° 01′; 5. Guts Lake, Lat. 59° 33′, Long. 108° 42′; 6. Stony Rapids, Lat. 59° 16′, Long. 105° 50′.

Map C. Detail map of east-central Saskatchewan. Scale: 1 inch equals 24 miles. The Hansen Lake road is indicated by a dashed line. 7. Candle Lake, Lat. 53° 50′, Long. 105° 18′; 8. White Gull Lake, Lat. 53° 56′, Long. 105° 04′; 9. Lower Fishing Lake, Lat. 54° 03′, Long. 104° 37′; 10. Big Sandy Lake, Lat. 53° 27′, Long. 104° 05′; 11. Limestone Lake, Lat. 54° 38′, Long. 103° 13′; 12 Sturgeon Weir River, Lat. 54° 46′, Long. 102° 35′; 13. Jan Lake, Lat. 54° 56′, Long. 102° 55′; 14. Kistapiskaw Lake, Lat. 54° 50′, Long. 102° 43′.

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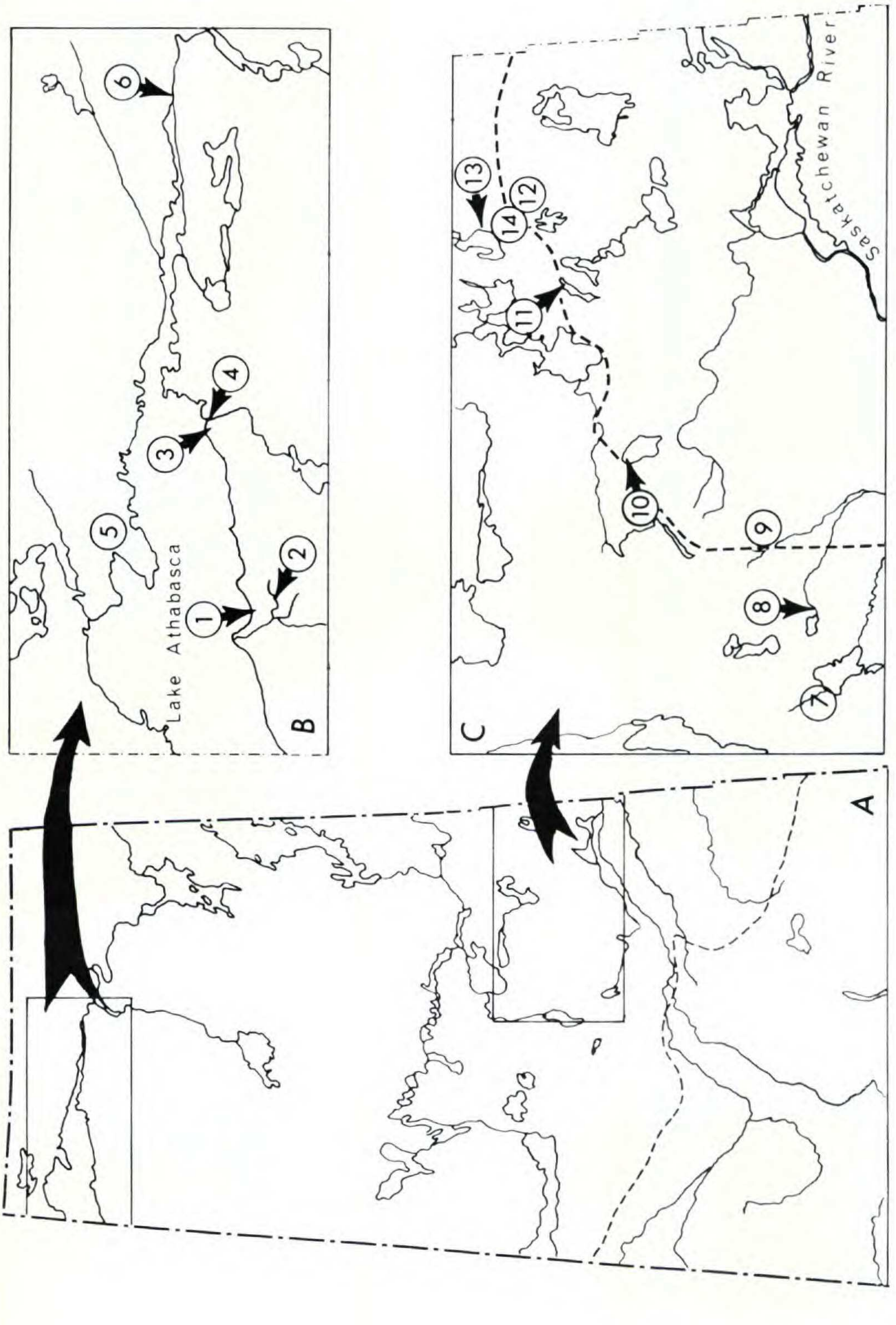
Lake Athabasca
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by Scotter (1961) and Argus (1962, 1964 and 1966). However, in spite of these efforts much of northern Saskatchewan remains botanically unexplored and phytogeographically unknown.

It is the purpose of this paper to comment on 25 new or otherwise interesting unpublished records for boreal Saskatchewan (map A) in order to make this information generally available to taxonomists and phytogeographers. The collections reported here have been made by a number of botanists including J. Hudson, J. S. Maini, M. Swan and the author. All specimens cited here have been deposited in the W. P. Fraser Herbarium (SASK). The collection numbers are the author's unless otherwise indicated. The localities included in this report are plotted on maps B and C.

ISOETES MACROSPORA Dur. Stony Rapids *487-63 and 488-63*. Collections of this species were made on the north and south sides of the Fond-du-Lac River near the settlement of Stony Rapids. The plants were rooted in sand in water 1 to 2 feet deep. Specimen *487-63* was associated with *Subularia aquatica* and specimen *488-63* was growing in a disturbed area used for beaching boats near the Hudson's Bay Company store.

This is the first record of this eastern North American species for Saskatchewan. It was previously reported from Minnesota by Muenscher (1944, map 380) and from northern Manitoba by Ritchie (1959). The specimens were determined by Dr. C. F. Reed.

ISOETES MURICATA Dur. var. BRAUNI (Dur.) Reed. Limestone Lake *4568;* Jan Lake *4691;* Kistapisken Lake *4323*; Little Gull Lake *552-63* and *556-63*. Growing in shallow water, 1/4 in. to 3 feet deep, rooted in sand on lake edges.

*Isoetes muricata* var. *braunii* apparently occurs throughout northern Saskatchewan on the Precambrian Shield. On the Hansen Lake Road it was not observed in lakes on glacial till but it did appear in Limestone Lake located on Ordovician limestone and was widespread in lakes on the

Precambrian Shield. In northwestern Saskatchewan it was collected in lakes overlying the Precambrian sandstones. Previously it was collected in Saskatchewan by Hudson at Creighton, on the south shore of Meridian Lake, and by Argus (1966) in the northeastern corner of Saskatchewan. The specimens were determined or verified by Dr. C. F. Reed.

ISOETES MURICATA Dur. var. HESPERIA Reed. Sturgeon Weir River *4677*. Growing in shallow water on river's edge; associated with *Elodea canadensis*. A single collection referable to this variety was determined by Dr. C. F. Reed. This is the first record of this variety for Saskatchewan.

NAJAS FLEXILIS (Willd.) R. & S. Big Sandy Lake, *Argus & Hudson 4541*. Rare; growing in water 4 to 6 feet deep on the north side of the lake; associated with *Potamogeton friesii, P. gramineus, P. natans, P. vaginatus, P. zosteriformis* and *Myriophyllum exalbescens*.

This is the first record of this species from Saskatchewan. The American distribution of this amphi-Atlantic species is apparently incompletely understood. Fernald (1929, 1950) describes the species as disjunct in North America with an eastern area extending from Newfoundland to southern Manitoba and a western area in Washington, Oregon and southern British Columbia. Hultén (1958) also maps the species as partially disjunct but includes specimens from the Northwest Territories (just south of Great Slave Lake) and from the North Saskatchewan River at the Saskatchewan-Alberta boundary which partially close the gap between the eastern and western areas. The record reported here from east-central Saskatchewan further fills the gap and suggests that the species may be expected throughout the southern edge of the boreal forest in Saskatchewan, particularly in lakes on glacial till.

FESTUCA RUBRA sens. lat. This circumpolar taxon is highly complex biologically and nomenclaturally and sorely in need of taxonomic revision (see Hultén, 1964, for map and discussion). In northwestern Saskatchewan it is represented by three variants which are outlined here.

FESTUCA RUBRA L. sens. str. McFarlane River sand dunes *773-62*. Growing on the lee slope of a sand dune invading Yakow Lake; associated with *Bromus pumpellianus, Calamagrostis inexpansa, Deschampsia caespitosa* ssp. *beringensis, Elymus mollis* ssp. *mollis, Salix planifolia, Stellaria arenicola* and *Tanacetum huronense* var. *floccosum*.

Specimens referrable to the European *F. rubra* were encountered at Yakow Lake near the eastern end of Lake Athabasca. They differ from the *F. rubra* ssp. *richardsonii* var. *glabrata* in their broader leaves (2 mm broad vs. less than 1 mm broad), taller culms (80 dm tall vs. about 30 dm tall) and longer panicles (9-10 cm long vs. 4-8 cm long).

This species was reported by Raup (1936) from the sand dunes at William Point and from Ennyeuse Creek. I have not seen Raup's specimens and they may represent *F. rubra* or *F. rubra* ssp. *richardsonii* var. *glabrata*.

FESTUCA RUBRA L. var. PROLIFERA Piper. McFarlane River sand dunes *777-62*. Growing with *Festuca rubra* and its associated species.

Only one proliferous specimen of *Festuca* was seen and with the exception of its proliferous florets it looks exactly like *Festuca rubra (Argus 773-62)*. Apparently this variety is new to Saskatchewan (see map 12, of *F. prolifera*, in Porsild, 1966). Raup (1936) cited proliferous forms of *F. rubra* ssp. *richardsonii* (as *F. rubra* var. *arenaria*), however, it is unlikely that this material is the same as *F. rubra* var. *prolifera* for the villous lemmas of ssp. *richardsonii* would immediately separate the two.

FESTUCA RUBRA ssp. RICHARDSONII (Hook.) Hult. *(F. rubra* var. *arenaria)*. William River sand dunes *215-62, 403-62, 414-62, 415-62, 507-63, 515-63, 516-63, 567-63, 573-63* and *584-63;* McFarlane River sand dunes *671-62* and *745-62*.

This is an important sand binding species and occurs on active sand dunes or in agrading depressions. On active dunes it is associated with *Bromus pumpellianus, Calamagrostis neglecta, Deschampsia caespitosa* ssp. *beringensis, Elymus mollis* ssp. *mollis, Salix brachycarpa, Stellaria arenicola* and *Achillea millefolium* ssp. *lanulosa* var. *mega-*

*cephala*. On more stable sites it may be associated with *Agrostis scabra*, *Calamagrostis neglecta*, *Arabis lyrata* and *Armeria maritima* var. *interior*.

This subspecies of *F. rubra*, with conspicuously villous lemmas, is very common on the Lake Athabasca sand dunes and was previously reported for Saskatchewan by Raup (193) as *F. rubra* var. *arenaria*.

FESTUCA RUBRA ssp. RICHARDSONII var. GLABRATA Hult. William River sand dunes *227-62*, *404-62*, *428-62*, *429-62*, *519-63*, *541-63*, *568-63*, *569-63* and *572-63*; McFarlane River sand dunes *660-62*, *661-62*, *663-62*, *683-62* and *795-62*. This variety of *richardsonii* often occurs with typical ssp. *richardsonii* and may have the same associated species. However, it may occur in more stablized sand dune depressions in association with *Calamagrostis neglecta*, *Carex aquatilis*, *Juncus balticus* var. *littoralis*, *Salix brachycarpa*, *S. planifolia*, *S. turnorii*, *Stellaria arenicola*, *Arabis lyrata*, *Empetrum nigrum* and *Armeria maritima* var. *interior*.

The var. *glabrata* is distinguished from the typical variety by its glabrous or merely sparsely pilose lemmas. In this character it resembles *F. rubra* sens. str. but differs as previously described. Populations containing both var. *glabrata* and var. *richardsonii* are common and intergrades are sometimes encountered (cf. *Argus 572-63* and *414-62*).

TORREYOCHLOA PALLIDA (Torrey) Church var. FERNALDII (Hitchc.) Dore. Yakow Lake *806-62*; Stony Rapids, *Maini & Swan 295*. The Yakow Lake collection was growing in wet sand on the lake edge associated with *Ranunculus reptans*, *Agrostis scabra* and *Equisetum fluviatile*. The Stony Rapids collection was reportedly growing in a "swamp".

This is principally an eastern North American taxon with two disjunct records from western Canada, one from British Columbia and a second from Alberta near the western end of Lake Athabasca (Koyama and Kawano, 1964, map 9A). The collections reported here extend the known range of the species into Saskatchewan and partially fill the gap in the range of var. *fernaldii*. The Yakow Lake specimen was identified by Dr. W. Dore.

CAREX MARITIMA Gunn. William River sand dunes *270-62* and *524-63*. Occurring on gravel barrens ridges within the sand dune complex; associated with *Silene acaulis*, *Arabis arenicola*, *Armeria maritima* var. *interior* and *Artemisia campestris* ssp. *borealis*.

This species is rare in Saskatchewan and was seen only twice in the Lake Athabasca sand dunes although it was sought assiduously throughout the area. This is the first Saskatchewan record of this arctic circumpolar species and a southward extension of its range. Porsild (1964, map 78) and Hultén (1964, map 41) show the nearest previous locality for this species to be Great Slave Lake, Northwest Territories.

CAREX MICHAUXIANA Boeckl. Little Gull Lake *491-63*. Growing on a bog island on the north edge of Little Gull Lake; associated with *Sphagnum* spp., *Rhynchospora alba*, *Juncus stygius* var. *americanus*, *Arethusa bulbosa*, *Spiranthes romanzoffiana*, *Drosera anglica*, *D. rotundifolia*, *Sarracenia purpurea* and *Oxycoccus quadripetalus*.

This is the first record of this eastern American species in Saskatchewan. It was previously known as far west as western Ontario (Fernald, 1950) but has not yet been reported for Manitoba.

CAREX OLIGOSPERMA Michx. Little Gull Lake *211-62*, *318-62*, *338-62* and *500-63*. Growing in *Carex* fens at the edge of bog islands; associated with *Sphagnum recurvum*, *Scheuchzeria palustris* var. *americanus*, *Carex limosa*, *C. rostrata*, *Eriophorum gracile* and *Smilacina trifolia*.

This is the third report of this uncommon subarctic species for Saskatchewan. It was previously reported from Methye Portage (Breitung, 1957) and from the south shore of Lake Athabasca (Raup, 1936).

CAREX PAUCIFLORA Lightf. Little Gull Lake *353-62* and *588-63*. Growing in *Sphagnum* in open *Picea mariana-Larix laricina* bogs and on a bog island.

This is the first report of this subarctic circumpolar species for Saskatchewan. Previously it was reported from three localities in Manitoba; (1) 50 miles northeast of

Winnipeg (Scoggan, 1957), (2) Reindeer Lake (Baldwin, 1953) and (3) northwest of Lake Winnipeg (Hultén, 1964). The latter locality which appears, on Hultén's map No. 77, to be located in Saskatchewan is actually in western Manitoba because of an error in positioning the Saskatchewan-Manitoba boundary on Hultén's base map.

CAREX TRISPERMA Dew. Little Gull Lake *295-62* and *350-62*. Growing in *Picea mariana-Larix laricina* muskegs and on bog islands along lake edge. The muskeg collection was associated with *Carex aquatilis* and *C. paupercula*. The collection from the bog islands was growing in *Sphagnum* associated with *S. centrale*, *S. teres*, *S. warnstorifianum*, *Aulacomnium palustre*, *Calliergon stramineum*, *Drepanocladus unciatus*, *Carex paupercula*, *Eriophorum vaginatum* ssp. *spissum*, *Scirpus hudsonianus*, *Arethusa bulbosa*, *Drosera anglica*, *Sarracenia purpurea* and *Oxycoccus quadripetalus*.

This is the second report of this eastern North American species from Saskatchewan. It was previously reported for Saskatchewan by Hooker (1840) who cited Drummond's collection from Cumberland House. Its occurrence at Little Gull Lake extends its range over 450 miles into northwestern Saskatchewan. Breitung's (1957) citation of this species from Candle Lake, is unsubstantiated because the specimen cited by him could not be located.

ELEOCHARIS NITIDA Fern. Stony Rapids, *Maini & Swan 446*. In a waterlogged roadside ditch.

According to Fernald (1950) this species occurs from Newfoundland to Alaska and south locally to Nova Scotia, northern New Hampshire and northern Minnesota. It is essentially an eastern American species with a small disjunct area in the Western Pacific Coast region of Alaska. The present report constitutes a local occurrence of the species in northern Saskatchewan and is a new record for the province.

RHYNCHOSPORA ALBA (L.) Vahl. Little Gull Lake *492-63*. Growing on a bog island; associated with *Sphagnum* spp., *Carex michauxiana*, *Juncus stygius* var. *americanus*, *Are-*

*thusa bulbosa, Drosera rotundifolia, D. anglica, Sarracenia purpurea* and *Oxycoccus quadripetalus.*

*Rhynchospora alba* is a boreal species with a more or less disjunct circumpolar distribution (Hultén, 1958, map 249). Its range in North America consists of a large area in northeastern United States and adjacent Canada, a smaller area in the Pacific Northwest and an isolated locality in Alaska. In Saskatchewan the species has been reported from several localities in the aspen parkland and the southern boreal forest (Breitung, 1957). This record extends the range of the species into northwestern Saskatchewan and suggests that the species is to be expected in Manitoba and Alberta thereby closing the gap in its North American range. The identification of *R. alba* was verified by A. E. Porsild.

JUNCUS ALPINUS Vill. ssp. NODULOSUS (Wahl.) Lindm. MacFarlane River sand dunes *786-62.* Found in only one locality growing in a wet depression within the active sand dune complex; associated with *Juncus balticus, Agrostis scabra, Calamagrotis neglecta, Festuca rubra* ssp. *richardsonii* var. *glabrata, Salix brachycarpa, S. silicicola* and seedlings of *S. planifolia* and *S. turnorii.*

This circumpolar species occurs widely in the southern half of Saskatchewan (Hultén, 1964, map 88). This report extends its range into northwestern Saskatchewan. It was previously reported by Raup (1936) from northeastern Alberta and from Great Slave Lake and it is to be expected elsewhere in boreal Saskatchewan.

JUNCUS STYGIUS L. ssp. AMERICANUS (Buch.) Hult. Little Gull Lake *462-62* and *493-63.* Infrequent in *Sphagnum* bogs on the north side of Little Gull Lake. The first specimen was collected on a bog island where it was associated with *Carex michauxiana, Rhynchospora alba, Arethusa bulbosa, Drosera rotundifolia, D. anglica, Sarracenia purpurea* and *Oxycoccus quadripetalus.* The second collection was growing on the inundated margin of a bog island; associated with *Drosera anglica* and seedlings of *Utricularia* sp. (probably *U. intermedia*).

This is the second report of this boreal circumpolar species for Saskatchewan. It was previously reported by Raup (1936) from a slough on William's Point about 13 miles northwest of the locality reported here (Hultén, 1958, map 230).

SILENE ACAULIS L. ssp. ACAULIS var. EXSCAPA (All.) DC. William River sand dunes *272-62* and *528-63*; MacFarlane River sand dunes *690-62*. Forming hummocks on the gravel barrens ridges within the sand dune complex; associated with *Carex maritima*, *Arabis arenicola*, *Armeria maritima* var. *interior* and *Artemisia campestris* ssp. *borealis*.

*Silene acaulis* and its associated species are restricted to the gravel barrens ridges in the sand dune region of northwestern Saskatchewan. The ridges are covered with a veneer of ventifacts, stones polished by wind-blown sand, and are apparently more stable than other open sand dune habitats. However, the ridges are being slowly degraded and perched specimens of *Salix silicicola* were observed. The species growing on the ridges of the gravel-barrens either have tap roots or are low growing rhizomatous species which are not adapted to agrading dune habitats.

This is the first record of this arctic-alpine, amphi-Atlantic species for Saskatchewan (Hultén, 1958, map 180). The nearest previous location for the species was the eastern arm of Great Slave Lake, N. W. T. (Raup, 1936).

The three specimens cited here have the ciliolate leaf margins characteristic of the species (Hitchcock and Maguire, 1947). However, within the William River sand dunes, plants with non-ciliolate leaf margins are common. As far as I am able to determine, this characteristic is restricted to the Saskatchewan populations and in view of the general endemism which occurs in the Lake Athabasca sand dunes (Raup, 1936) taxonomic recognition of this variant is appropriate. I propose the following name for these populations: **Silene acaulis** L. ssp. **acaulis** var. **exscapa** forma **athabascensis**, forma nov.; differt a specie foliis non ciliolatis; *Argus 529-63* (holotype), *530-63*, *531-63* and *532-63* (SASK). The forma *athabascensis* occurs in the same habi-

tats as the typical form and one specimen *(Argus 272-62)* may be an intermediate having entire and sparsely ciliolate leaves on the same plant.

POLYGONUM VIVIPARUM L. Candle Lake *4906*; White Gull Creek, *Hudson & Argus 4395*; Lower Fishing Lake, *Argus & Hudson 4416*. The Candle Lake collection was made at Hanin Creek where the species was growing in a very wet *Carex aquatilis-Drepanocladus* fen on the edge of a marly fen. The habitat of the White Gull Creek population was a rich, heavily shaded, stream-side *Salix* thicket including *Salix planifolia, S. pellita, Agropyron trachycaulum, Calamagrostis canadensis, Carex aurea, Stellaria calycantha, S. longifolia, Rubus acaulis, Ribes triste, Halenia deflexa, Mentha arvensis* var. *villosa* and various mosses. The Lower Fishing Lake population occurred in mossy turf along the edge of a lake growing in an open *Salix* thicket adjacent to a *Picea mariana* woods; associated with *Selaginella selaginoides, Equisetum scirpoides, Carex concinna, Zygadenus elegans, Populus balsamifera, Salix bebbiana, S. maccalliana, S. myrtillifolia, S. planifolia, Betula glandulifera, Comandra livida, Silene menziesii, Fragaria virginiana, Potentilla fruticosa, Rubus acaulis, Mitella nuda, Pyrola secunda, Galium septentrionale, Lonicera villosa, Campanula rotundifolia* and *Achillea millefolium*.

This common arctic-alpine circumpolar species was first reported for Saskatchewan from the northeastern corner of the province (Argus, 1966) where it occurred on a boulder field with other arctic species and in mossy turf on a lake edge, a habitat very similar to the Lower Fishing Lake locality. Since that time it unexpectedly has been found in several locations near the southern edge of the boreal forest and is to be expected elsewhere in suitable habitats. Porsild maps a locality in northwestern Saskatchewan (1964, map 130), however, I have not verified this collection.

NYMPHAEA TETRAGONA Georgi ssp. LEIBERGII (Morong) A. E. Porsild. Little Gull Lake *549-64*. An aquatic occurring in a slow moving stream draining Little Gull Lake.

The species is apparently common in this area but flowers late and was overlooked in 1962. The collection cited here was flowering on August 2nd. This is the second record of this species from Saskatchewan. It was previously reported by Breitung (1957) from the Saskatchewan River near Cumberland Lake.

ARABIS ARENICOLA (Richards.) Gelert var. ARENICOLA. William River sand dunes *268-62* and *410-62*. Growing on the ridges of the gravel barrens within the active dune complex; associated with *Carex maritima*, *Silene acaulis*, *Armeria maritima* var. *interior* and *Artemisia campestris* ssp. *borealis*.

The specimens cited here agree very well with specimens from the Northwest Territories and Quebec identified as *A. arenicola* except for their glabrous leaves and stems. According to Hopkins (1937) *A. arenicola* consists of two varieties, (1) the typical variety with stems and leaves glabrous and (2) var. *pubescens* (S. Wats.) Gelert, with hirsute stems and leaves. The specimens cited here seem to represent the typical variety which is endemic to the eastern North American Arctic (Porsild, 1964, map 197). A previous collection from the north shore of Lake Athabasca *(Tyrrell 34, 262)*, cited by Raup (1936) as this species is var. *pubescens* (Hopkins, 1937). This report is a notable westward extension of this taxon and is a first record of the species for Saskatchewan.

SUBULARIA AQUATICA L. ssp. AMERICANA Mulligan and Calder. Stony Rapids *489-63*. Growing in mud on north side of the Fond-du-Lac River; associated with *Isoetes macrospora*.

The material cited here has the broad siliques typical of ssp. *americana* (length/width = 1.5) but has the caducous sepals of ssp. *aquatica*. According to Mulligan and Calder (1964) a combination of these characters is common in the cordilleran material they studied and suggests that the Stony Rapids specimens have cordilleran affinities. This is the second record of this uncommonly collected species for

Sasketchewan, the first was collected by Hudson at Amisk Lake (Mulligan and Calder, 1964).

ARCTOSTAPHYLOS ALPINA (L.) Spreng. ssp. RUBRA (Rehder and Wils.) Hult. Candle Lake 4900; Guts Lake, *Maini & Swan 565*. The Candle Lake material was collected at Hanin Creek where it was locally abundant in a wet *Picea mariana-Larix laricina* woods; associated with *Aulacomnium* sp., *Selaginella selaginoides*, *Spiranthes romanzoffiana* and *Betula glandulifera*.

This species was previously reported from Charlotte Point, Sasketchewan (northwest of Uranium City) by Raup (1936) and from the northeastern corner of Sasketchewan by Argus (1966). The Candle Lake record is a southerly extension of the Saskatchewan range of this arctic circumpolar species.

PINGUICULA VULGARIS L. Candle Lake *4905*. Growing in a *Larix laricina* fen at the edge of a marly fen; associated with *Drepanocladus* sp. and *Carex aquatilis*.

The occurrence in Saskatchewan of this arctic, circumpolar species has been reported by several authors. The earliest collections were made by W. P. Fraser in a *Carex* fen (calcareous bog) at Prince Albert near the southern edge of the boreal forest. In 1963 it was found in the subarctic northeastern corner of the province (Argus, 1966) and the next year it was discovered at Strawberry Lakes, ca. 50 miles east of Regina, Sasketchewan, well within the prairie zone (Jones, 1964). The specimen cited here was collected about 50 miles northeast of Prince Albert. It is rare in this area where it is restricted to cold, wet calcareous fens.

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